

USPTO Serial Number: 10/763,795

Divakar et al.

Reply to Office Action dated March 7, 2005

Amendment to the Claims:

1. (Currently amended) A semiconductor device, comprising:
a semiconductor die;
a semiconductor package made with a thermally conductive overmolding compound containing an epoxy filler and granules which enhance thermal conductivity of the overmolding compound to a value greater than 2 watts/meter K, disposed on wherein the thermally conductive overmolding compound physically contacts the semiconductor die to directly transfer heat generated by the semiconductor die through the thermally conductive overmolding compound; and
a pin-fin heat sink mounted to substantially an entire surface area of the semiconductor package ~~a surface of the thermally conductive overmolding compound~~, wherein the heat generated by the semiconductor die is dissipated through the thermally conductive overmolding compound to the pin-fin heat sink.
2. (Original) The semiconductor device of claim 1, wherein the semiconductor die is a power semiconductor device.
3. (Canceled)
4. (Canceled)
5. (Original) The semiconductor device of claim 1 further including a leadframe supporting the semiconductor die.
6. (Original) The semiconductor device of claim 5 further

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including a plurality of wire bonds coupled between the semiconductor die and the leadframe.

7. (Original) The semiconductor device of claim 1, wherein the pin-fin heat sink includes a base with a plurality of pin-fins extending from the base.
8. (Original) The semiconductor device of claim 7, wherein the base includes scour lines between the pin-fins.
9. (Original) The semiconductor device of claim 1 housed in a quad flatpack no lead package, land grid array package, or ball grid array package.
10. (Original) The semiconductor device of claim 1 further including a heat slug disposed above the semiconductor die without contacting the pin-fin heat sink.
11. (Currently amended) A semiconductor device, comprising:
 - a heat generating semiconductor die;
 - a thermally conductive ~~overmolding compound~~ encapsulate containing granules within an epoxy filler to provide a thermal conductivity greater than 2 watts/meter K, disposed on wherein the thermally conductive encapsulate physically contacts a surface of the semiconductor die to distribute heat generated by the semiconductor die through the thermally conductive encapsulate; and
 - a heat sink disposed ~~on~~ over substantially an entire a surface of the thermally conductive ~~overmolding compound~~ encapsulate for dissipating the heat generated by the

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semiconductor die.

12. (Original) The semiconductor device of claim 11, wherein heat generated by the semiconductor die is dissipated through the thermally conductive overmolding compound to the heat sink.

13. (Original) The semiconductor device of claim 11, wherein the semiconductor die is a power semiconductor device.

14. (Canceled)

15. (Canceled)

16. (Original) The semiconductor device of claim 11, wherein the heat sink includes a base with a plurality of pin-fins extending from the base.

17. (Original) The semiconductor device of claim 16, wherein the base includes scour lines between the pin-fins.

18. (Original) The semiconductor device of claim 11 housed in a quad flatpack no lead package, land grid array package, or ball grid array package.

19. (Original) The semiconductor device of claim 11 further including a heat slug disposed above the semiconductor die without contacting the heat sink.

20-34. (Canceled)